

REMARKS/ARGUMENTS

Claims 2-3, 17-21, 23-24, and 27-28 have been amended by this response. No claims have been canceled or added by this response. Accordingly, claims 1-28 remain pending.

In the latest office action, the Examiner objected to claims 17-21 for failing to provide antecedent basis for the claim term "fixed layer". Accordingly, claims 17-21 have now been amended to recite a "pinned layer", a term having proper antecedent basis. Accordingly, the claim objections have now been overcome.

Also in the latest office action, the Examiner noted an error in the information disclosure statement and has since corrected the apparent mistake. Applicants confirm the correction made by the Examiner.

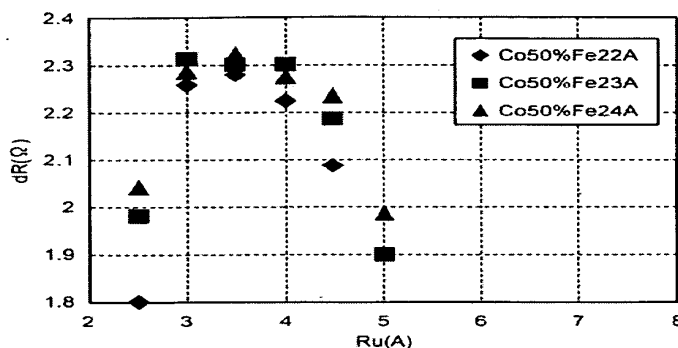
Claim 2 as well as claims 6, 7, 11, 12, and 16 as dependent upon claim 2, and also claim 23, are rejected under 35 U.S.C. §102(e) as being anticipated by Freitag et al. (US 2003/0179516 A1). Claims 3, 8, 13, and 24 are rejected under 35 U.S.C. §103(a) as being obvious in view Freitag et al.

The Examiner is respectfully reminded that claim 2 and several other claims stand rejected as anticipated, and not merely obvious, in light of the Freitag Patent:

[t]he distinction between rejections based on 35 U.S.C. 102 and those based on 35 U.S.C. 103 should be kept in mind. Under the former, the claim is anticipated by the reference. No question of obviousness is present. In other words, for anticipation under 35 U.S.C. 102, the reference must teach every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present. (Emphasis added; MPEP 706.02)

Like the instant application, the Freitag Patent does disclose an APC pinned layer 204 of API Co 90Fe10 /APC Ru/AP2 Co60Fe 40. Unlike the claimed embodiment, however, the Freitag Patent discloses a Ru thickness of 8Å.

FIG. 4 reproduced below, illustrates the dependence of the resistance change property on the Ru thickness.



As depicted above, the resistance change property has a peak of 3.0 to 4.0Å for Ru thickness. When the Ru thickness is outside of the 3.0 to 4.0Å range, the resistance change property has more dramatic and unpredictable results. This concept is further described in the specification at paragraph [89]:

When the resistance of the Ru film increases from 2.5 to 3.0Å, the resistance change increases from 2.0 to 2.3 Ω/□ and then settles constant from 3.0 to 4.0Å. The resistance change decreases from 2.3 Ω/□ to 2.0 Ω/□ as the thickness of Ru increases from 4.0 to 5.0Å. The resistance change of the spin valves takes a peak as described above because H_s has a sufficiently large value in this range, and it is preferred to select the range of 3.0 to 4.0Å for the thickness of the Ru film where the resistance change reaches a peak.

Amended claim 2 also recites this limitation: "wherein the anti-ferromagnetic coupling film is formed of Ru and has a thickness within a range from 3.0 to 4.0 .ANG." In short, when the Ru thickness is set to this particular range, a stronger and more stable resistance change property is achieved than that taught by the prior art.

Given that the Freitag Patent only discloses a method for improving the magnetostriction uniaxial anisotropy field by changing the content of the AP CoFe pinned layers, and lacks any teaching regarding the claimed thickness range, this reference fails to teach or suggest each and every element of the pending claims. In addition, the claimed embodiments can not be considered obvious in light of Freitag because the claimed thickness range achieves unexpected results relative to the prior art range, namely, a better resistance change property. Therefore, it is

respectfully asserted that continued rejection of these claims as anticipated or obvious in light of the Freitag Patent is improper, and these claim rejections should be withdrawn.

Independent claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa (JP 10-223942) et al. in view of Heim et al. (US 5,465,285). This claim rejection is overcome as follows.

In order to establish a prima facie case of obviousness, "the prior art reference (or references when combined), must teach or suggest all the claim limitations." MPEP 2142. Here, even the combination of the Nakazawa Patent with Heim Patent fails to teach each and every element of amended claim 27.


Nakazawa discloses a method of annealing layers by impressing magnetic fields in two opposite directions and intersecting the easy axis of a free layer and the easy axis of a pinned layer. In order for the intersection of these two layers to occur, Nakazawa impresses a magnetic field with an annealing temperature of 210-250° for first annealing and 150-250° for second annealing. In contrast, embodiments of claim 27 conduct the two magnetic applying steps at room temperature in order to magnetize the two pinned layers. The annealing temperature used by the Nakazawa Patent are markedly higher than room temperature and therefore can not teach or suggest this element of amended claim 27. Support for claim 27 may be found in the specification as originally filed, at least at paragraphs [0020], [0021], [0201], and [0321].

As described above, the Nakazawa Patent does not teach a method for magnetizing two pinned layers at room temperature. This absent teaching is not supplied by the Heim patent, which discloses two ferromagnetic films antiferromagnetically coupled, but does not otherwise describe the desired magnetizing steps and temperatures.

Based upon the complete failure of the art relied upon by the Examiner to teach or even suggest all the elements of the amended independent claim, it is respectfully asserted that the obviousness claim rejection is improper and should be withdrawn.

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



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